

Title (en)

Magnetic lens for focusing a beam of charged particles

Title (de)

Magnetische Linse zum Fokussieren eines Strahls geladener Teilchen

Title (fr)

Lentille magnétique pour focaliser un faisceau de particules chargées

Publication

**EP 2827357 A1 20150121 (EN)**

Application

**EP 13176980 A 20130718**

Priority

EP 13176980 A 20130718

Abstract (en)

Prior art magnetic charged particle lens show a yoke and an air gap. The air gap defines the position where a magnetic field is present on the optical axis of the lens. A lens (10) according to the invention has no air gap, but uses a part (15) of the yoke (13 + 16) that is saturated. This results in a lens with lower spherical aberration due to a more gradual break-out of the magnetic field. This also eliminates the alignment problems that prior art lenses show between upper and lower pole pieces. Preferably the part of the yoke that is saturated is an insert (16), resulting in better tolerances, better machinability and lower cost due to smaller size. Also, the insert (16) may show magnetic properties different from the rest of the yoke (13).

IPC 8 full level

**H01J 37/14** (2006.01); **H01J 37/141** (2006.01)

CPC (source: CN EP US)

**G21K 1/093** (2013.01 - US); **H01J 37/141** (2013.01 - CN EP US); **H01J 37/26** (2013.01 - US); **H01F 2003/106** (2013.01 - EP US); **H01J 2237/1415** (2013.01 - CN EP US); **H01J 2237/26** (2013.01 - CN EP US); **Y10T 29/4978** (2015.01 - EP US)

Citation (applicant)

- NL 1025037 C2 20050620 - FEI CO [US]
- L. REIMER: "Scanning Electron Microscopy", 1985, SPRINGER VERLAG
- R. BOLL: "Weichmagnetische Werkstoffe", VACUUM SCHMELZE

Citation (search report)

- [X] US 2305761 A 19421222 - BORRIES BODO V, et al
- [X] US 4525629 A 19850625 - MORITA HIROFUMI [JP], et al
- [X] US 4468563 A 19840828 - TSUNO KATSUSHIGE [JP], et al
- [X] US 3984687 A 19761005 - LOEFFLER KARL H, et al

Designated contracting state (EPC)

AL AT BE BG CH CY CZ DE DK EE ES FI FR GB GR HR HU IE IS IT LI LT LU LV MC MK MT NL NO PL PT RO RS SE SI SK SM TR

Designated extension state (EPC)

BA ME

DOCDB simple family (publication)

**EP 2827356 A1 20150121**; CN 104299872 A 20150121; CN 104299872 B 20180216; EP 2827357 A1 20150121; JP 2015023030 A 20150202; JP 6389671 B2 20180912; US 2015021476 A1 20150122; US 9595359 B2 20170314

DOCDB simple family (application)

**EP 14176646 A 20140711**; CN 201410343248 A 20140718; EP 13176980 A 20130718; JP 2014146608 A 20140717; US 201414333174 A 20140716